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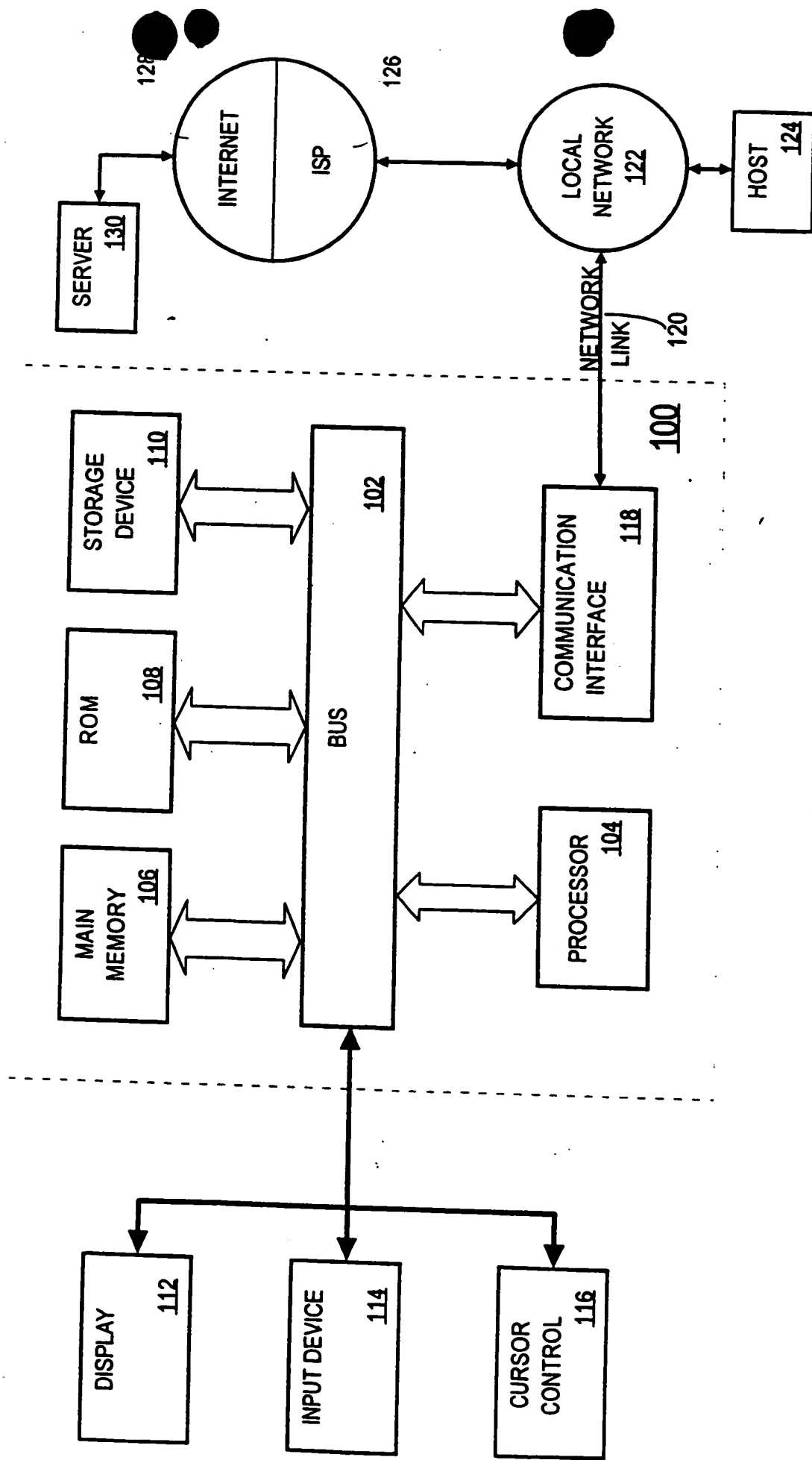


FIG. 1

09872413-060404

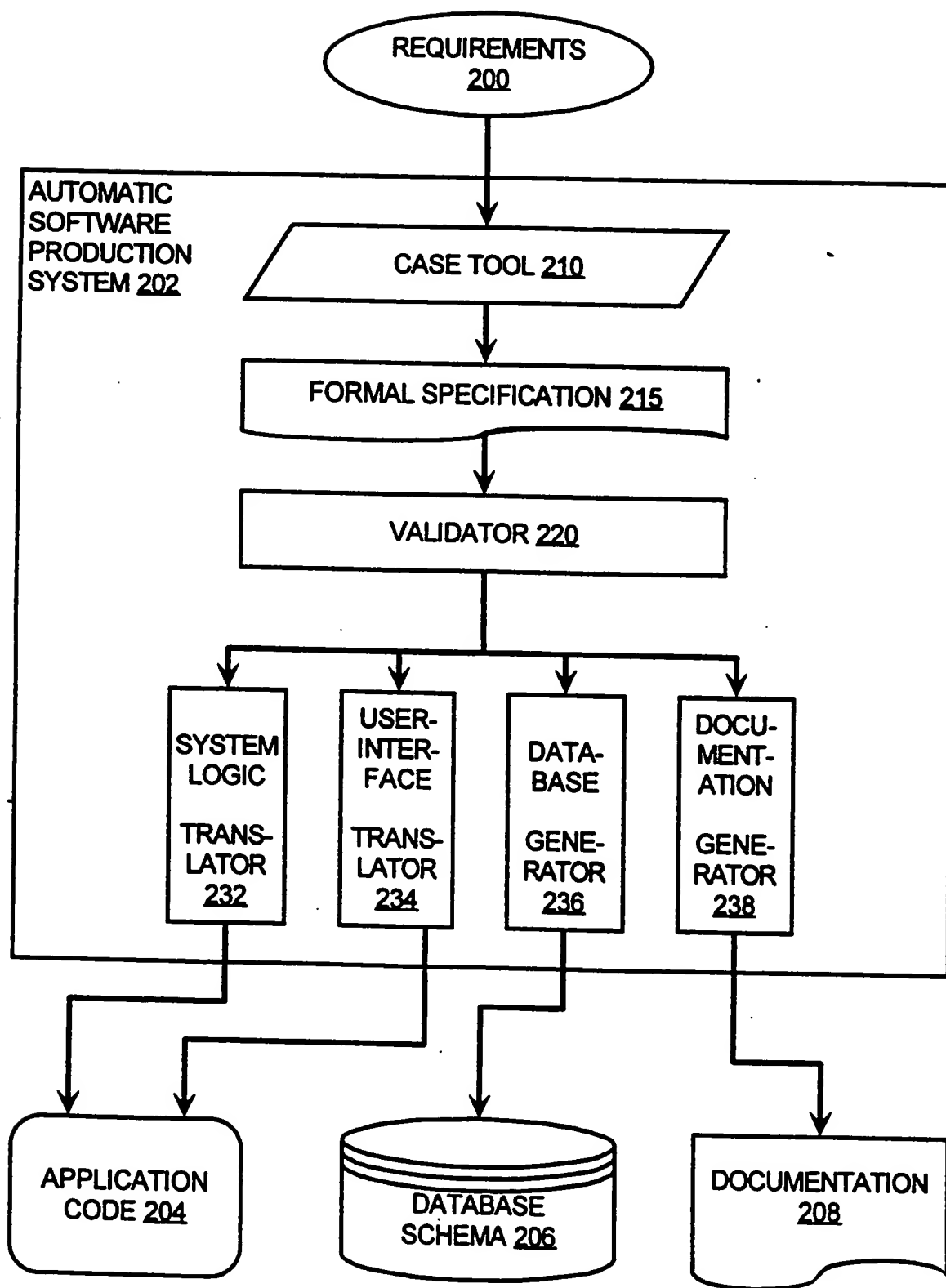


FIG. 2

The screenshot displays the SOSY Modeler interface with a conceptual schema for a library system. The schema is titled 'Esquema Conceptual - Library.oom'. The entities and their attributes are as follows:

- book**: book\_code, state, destroy\_book, loan\_book, new\_book
- librarian**: librarian\_name, destroy\_libra, new librarian, FORGIVE
- loan**: loan\_code, loan\_data, loan\_book, return\_book
- reader**: age, id\_reader, num\_books, destroy\_read, loan\_book, new\_reader
- unreliable\_read**: forgive

Handwritten annotations in black ink are present throughout the diagram:

- 300**: Located at the bottom left of the diagram.
- 310**: Points to the **loan** entity.
- 312**: Points to the **loan\_code** attribute.
- 314**: Points to the **loan\_data** attribute.
- 316**: Points to the **loan\_book** attribute.
- 318**: Points to the **return\_book** attribute.
- 320**: Points to the **author** entity.
- 322**: Points to the **book\_code** attribute.
- 324**: Points to the **state** attribute.
- 326**: Points to the **destroy\_book** attribute.
- 328**: Points to the **loan\_book** attribute.
- 330**: Points to the **librarian** entity.
- 332**: Points to the **destroy\_libra** attribute.
- 334**: Points to the **new librarian** attribute.
- 336**: Points to the **FORGIVE** attribute.
- 340**: Points to the **reader** entity.
- 342**: Points to the **age** attribute.
- 346**: Points to the **id\_reader** attribute.
- 348**: Points to the **num\_books** attribute.
- 344**: Points to the **destroy\_read** attribute.
- 343**: Points to the **loan\_book** attribute.
- 350**: Points to the **unreliable\_read** entity.
- 352**: Points to the **FORGIVE** attribute.

Relationships and other annotations:

- A 1:1 relationship is shown between **author** and **reader**.
- A 1:M relationship is shown between **loan** and **reader**.
- A relationship labeled **READER. PUNISH/FORGIVE** is indicated near the **unreliable\_read** entity.

FIG. 3

SOSY Modeler - [Diagrama de Transición de Estados - Library.oom]

Archivo Edición Proyecto Vista Herramientas

Class: book

```
stateDiagram-v2
    [*] --> 402
    402 --> 404 : [*]new_book
    404 --> 412 : [*]loan_book F state = "available"
    412 --> 404 : [*]return_book F state = "lent"
    404 --> 406 : [*]destroy_book
    406 --> [*]
```

Press F1 for Help

FIG. 4A

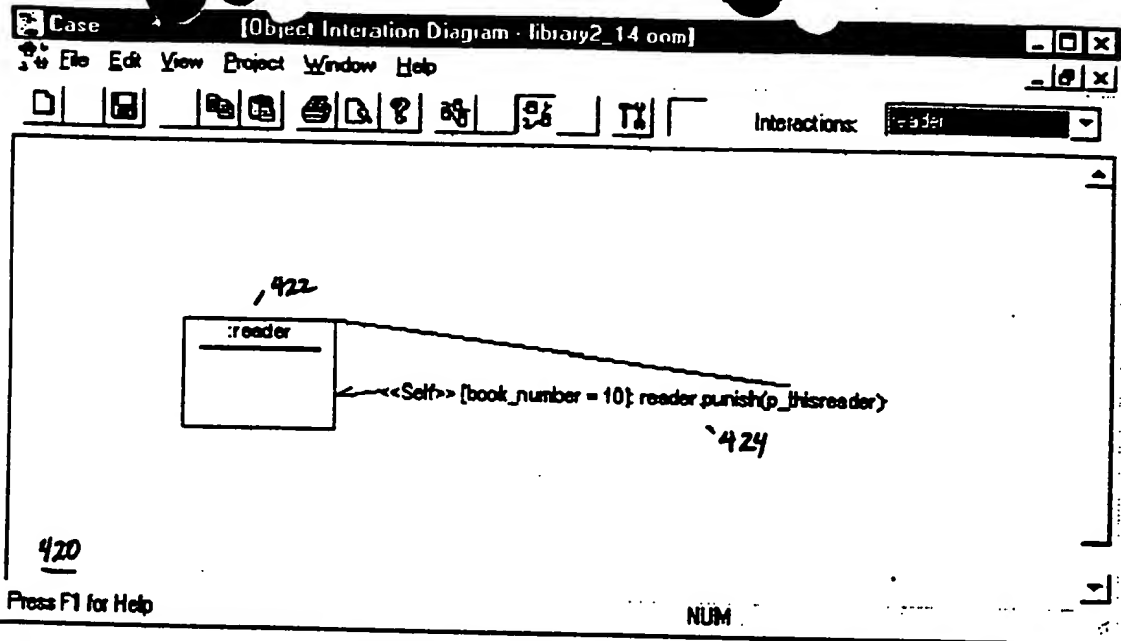


FIG. 4B

Functional Model

Class: reader Attribute: book\_number

Event	Effect	Condition
loan_book	1	
return_book	1	

Category: ☒ Function ☐ State-independent ☐ Discrete-domain

Valuation Details:

Event: loan\_book Action type: Increment

Valuation condition:

Effect of the event:

1

FIG. 5

09072413 050101

FLOWCHART OF THE FUNCTIONS THAT ALL SPECIES OF SYSTEM LOGIC TRANSLATORS WILL PERFORM

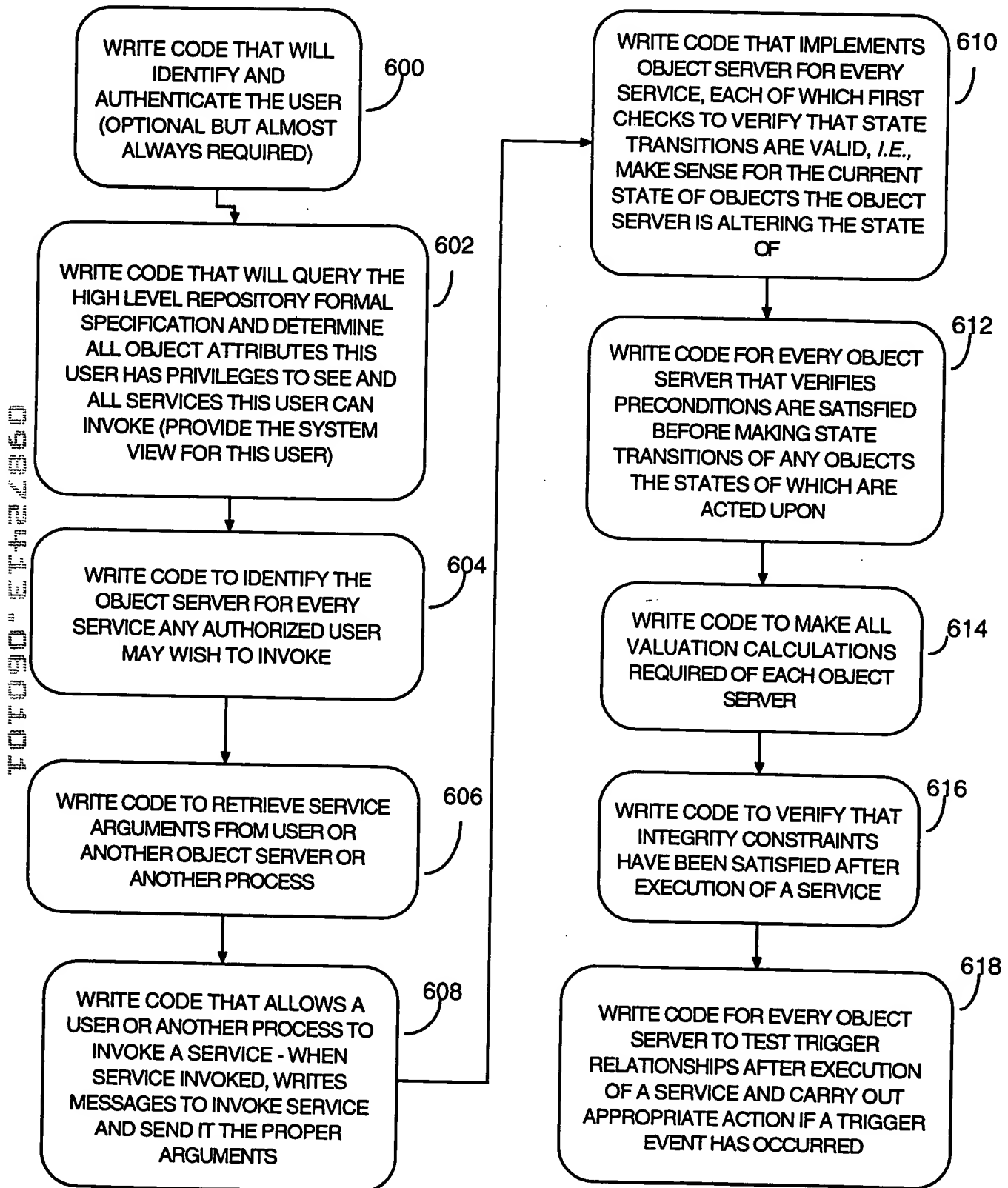


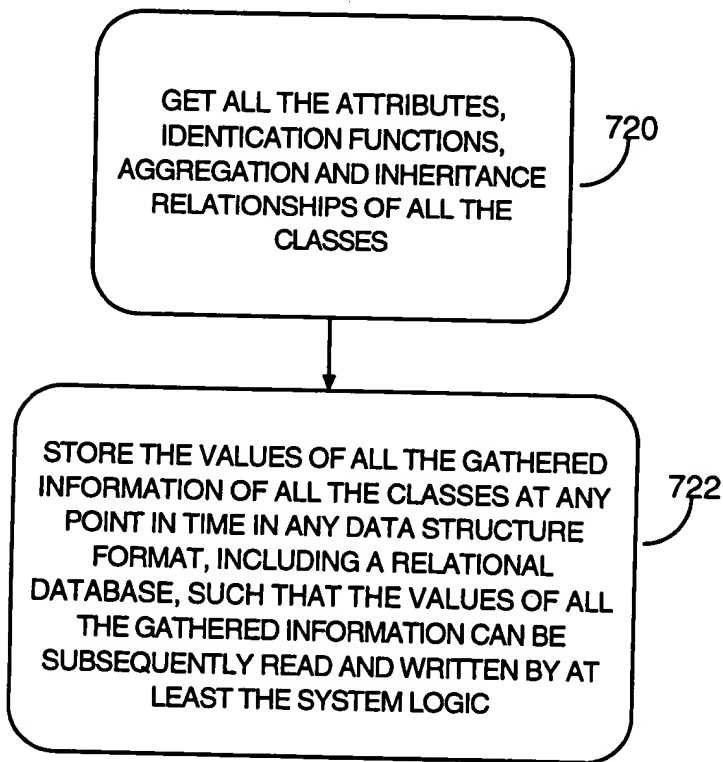
FIG. 6

# 2023





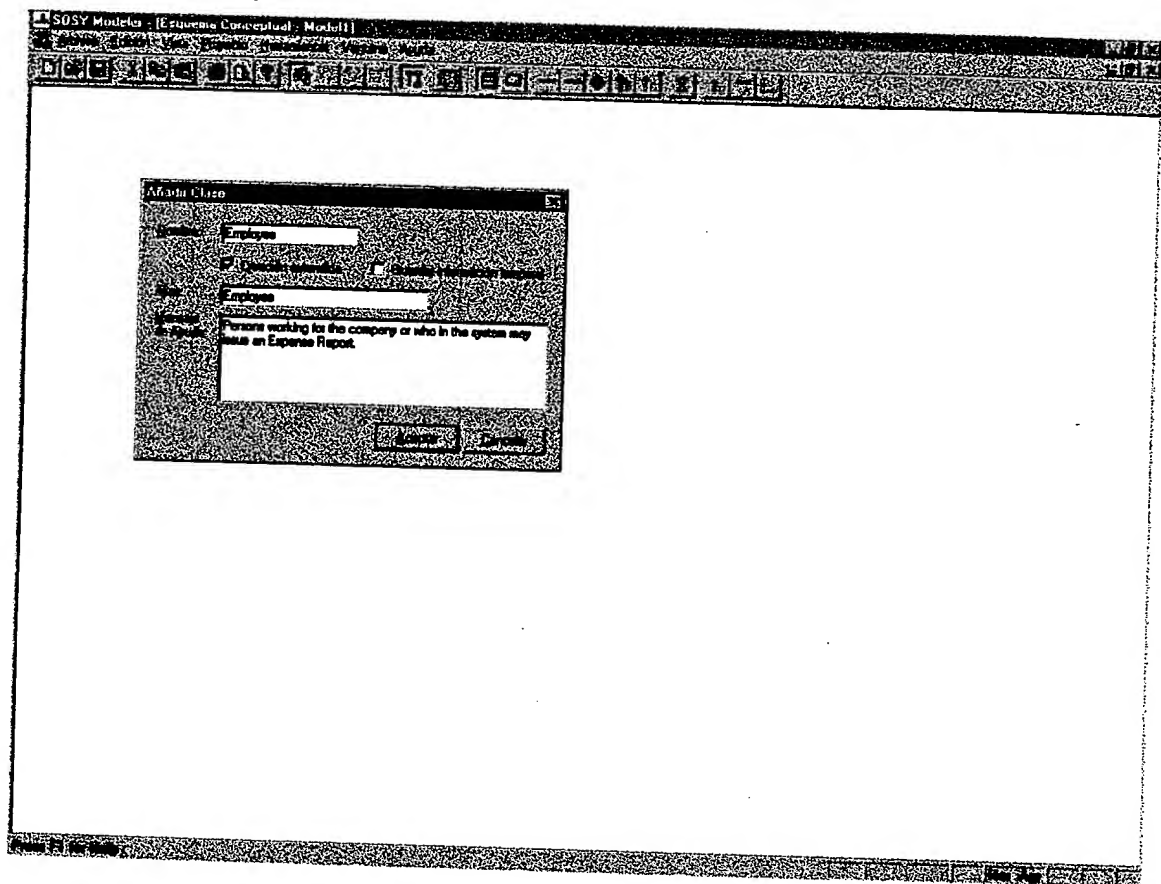
FLOWCHART OF THE FUNCTIONS THAT ALL SPECIES IN THE DATABASE GENERATOR  
TRANSLATOR SUBGENUS WILL PERFORM



09072413.060104

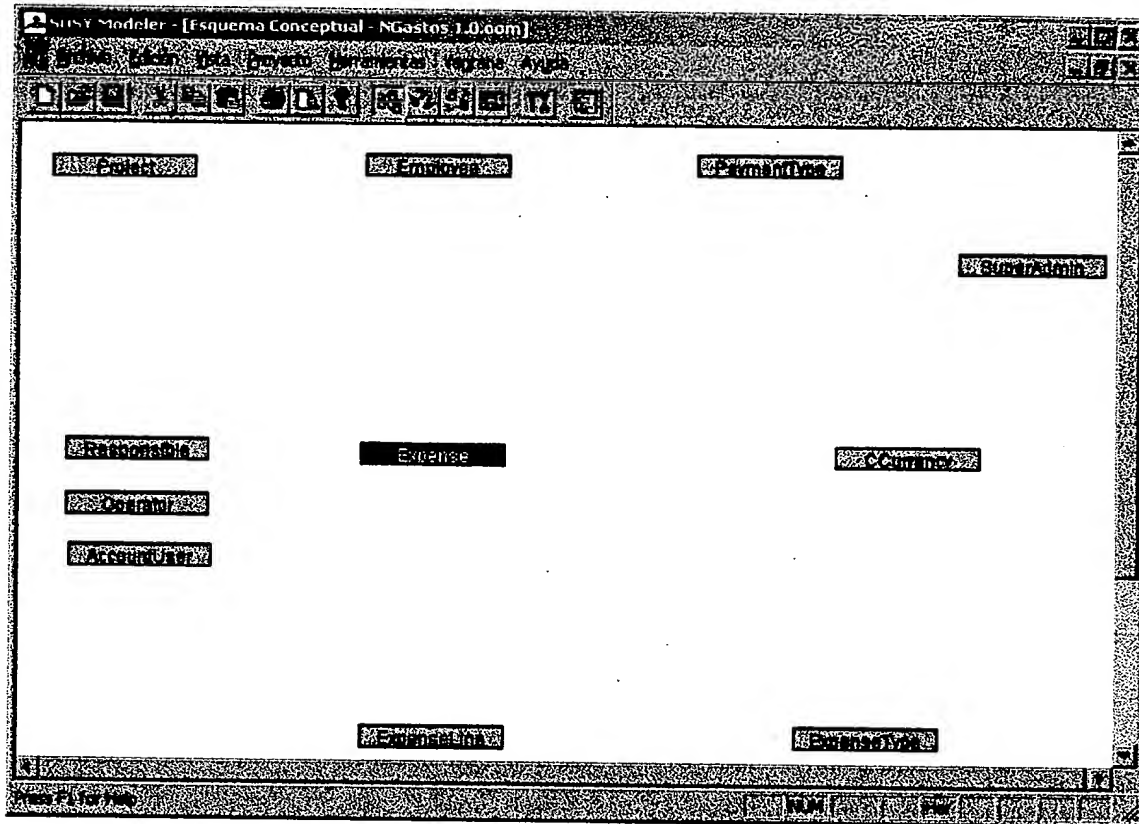
FIG. 8

09872413.060101



class creation dialog

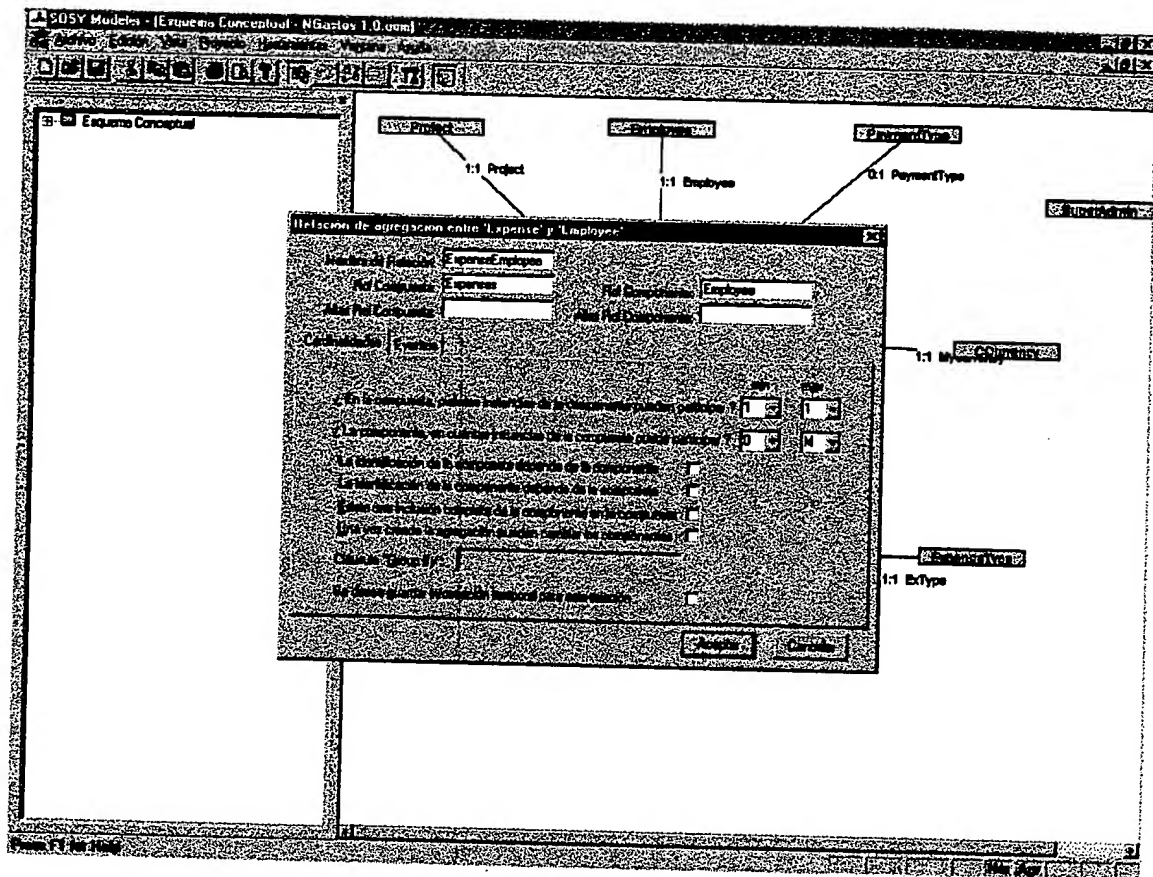
FIG. 9A



DIALOG SHOWING ALL CLASSES NEEDED & CREATED  
IN EXPENSE MANAGEMENT SYSTEM

FIG. 9B

09876443.060404

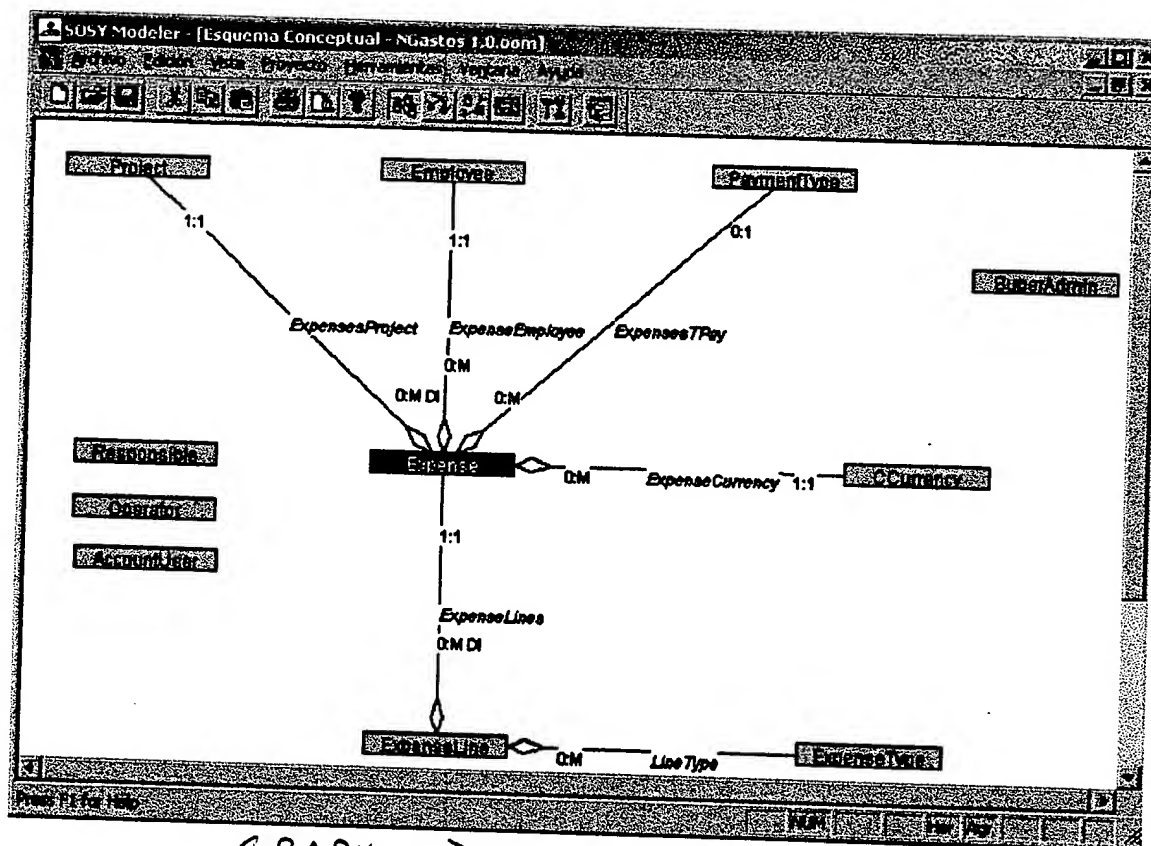


dialog to create and modify relationships between classes

FIG. 90

09872413.060101

figure shows relationships found with all their properties indicated.



GRAPHIC DIALOG TO CREATE  
RELATIONSHIPS BETWEEN CLASSES  
AND GRAPHICALLY SHOW THE  
RELATIONSHIPS SO CREATED

FIG. 10

09072443-060104

09872413, 060101

Clase

Atributos

Nombre	Tipo atributo	Tipo dato	Id	Tamaño	Valor directo	Permite nulos	Nulos
PresentDate	Constante	Date			today()	Si	No
Status	Variable	Int			0	No	No
Cause	Variable	String		255		Si	No
AuthoDate	Variable	Date			NULL	No	Si
AuthoComments	Variable	String		255	NULL	No	Si
PaymentDate	Variable	Date			NULL	No	Si
PayComments	Variable	String		255		No	Si
TotExpenses	Derivado	Real					
TotExpensesCur	Derivado	Real					
Advances	Variable	Real			0	Si	No
AdvancesCur	Derivado	Real					
Exchange	Variable	Real				No	Si
Balance	Derivado	Real					
BalanceCur	Derivado	Real					

Nombre:  Tipo Atributo:  Tipo Dato:

☐ Información Temporal

Alas:

Observaciones:

Clase:

(A)

Clase

Atributo:

Fórmulas de Derivación

Condición	Fórmula
	TotExpenses - Advances

Condición:

Fórmula:

Observaciones:

Clase:

(B)

FIG. 11

Expense

Expense Database Transactions Agents Transactions Relations General/Tools

Expense

Name	Type
newexpense	Now
deleteexpense	Destroy
close	
authorize	
approve	
pay	
rejectauthor	
rejectpayment	
InstPaymentType	Shared with PaymentType
BorPaymentType	Shared with PaymentType
DELETEALL	Tron
TPAY	Tron

Payment

Name	Type
p_InstExpense	Expense
p_Cause	String
p_Advances	Real
p_Exchange	Real

Expense

modify

New

Name of Agent

Description

Expense

Name

Type

Year for details

Description

Expense

Expense












Next figure shows the formula for the "DELETEALL" transaction:

Line

Attributes Services Derivations Restrictions Agents Transitions Relations Generalization

Transaction: DELETEALL

Formula:

FOR ALL Lines DO Lines.deleteLine( Lines ). deleteExpense( THIS )

Agent: Expense

Provider: approve

Restriction: R\_ThisExpense

Transition: ☐ Use Parameter as a Transition

Define

Accept Cancel

DIALOG TO DEFINE FORMULA FOR "DELETEALL"  
TRANSACTION  
FIG. 13

09872443.060101



The screenshot shows the 'New' dialog box in the 'Expense' application. The 'Class' dropdown is set to 'Expense'. The 'Exchange' field is empty, and the 'Exchange must be greater than zero' message is displayed. The 'Condition1' and 'Condition2' fields are empty, and the 'Condition must be greater than zero' message is displayed. The 'Condition' field is empty, and the 'Condition must be greater than zero' message is displayed.

INTEGRITY CONSTRAINTS OF EXPENSE CLASS  
FIG. 14

The value of the attribute "Cause" will be loaded with the value of the argument "p\_Cause" of the event "modify" when "modify" was executed.

Modelo Funcional

Clase: Expense    Atributo: Cause

Aceptar    Cancelar

Evento	Efecto	Condición
modify	= p_Cause	

☐ Cardinal   
 ☒ Definición   
 ☐ Destrucción

Detalles de Evaluación

Evento: modify

☐ Inferir para el resto de atributos

Condición de evaluación: IF: [ ]

Efecto del evento: [ p\_Cause ]

DIALOG BOX TO CREATE EVALUATION OF  
 "CAUSE" ATTRIBUTE WITH: THE  
 "MODIFY" EVENT TO FORM PART OF  
 FUNCTIONAL MODEL

FIG. 15

09872443-060101

09872413.060101

Clase

Relaciones | Servicios | Devoluciones | Reducciones | Agentes | Transacciones | Relaciones | Generalidades

Clase servidora:

Servicios

Servicio
newexpense
modify
close
authorize
rejectautho
DELETEALL

Relaciones

Relacion
Cause
AuthoComments

Clase AccountUser reports on:

Servicio	Temporizado
Expense.approve	No
Expense.rejectpayment	No
Expense.TPAY	No

Hacer temporal | No hacer temporal

Clase AccountUser tiene updated sobre:

Atributos
Expense.id_Expense
Expense.PresentDate
Expense.Status
Expense.PaymentDate
Expense.PayComments
Expense.AuthoDate
Expense.TotalExpenses
Expense.TotalExpensesCur
Expense.Advances

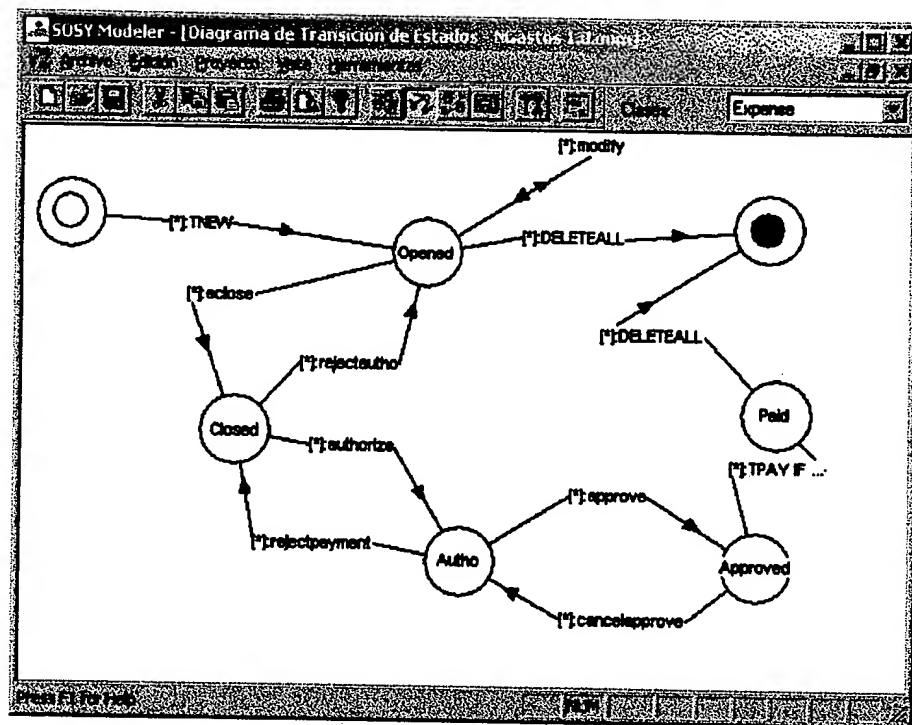
Clase:

Accept | Cancel

AGENT RELATIONSHIP DIALOG THAT CAN BE  
USED TO SET WHICH SERVICES "ACCOUNT USER"  
CAN ACCESS AND VISIBILITY OF CLASS  
ATTRIBUTES FOR THIS USER

FIG. 16

09072043-060104  
TOT030E72860



STATE TRANSITION DIAGRAM FOR CLASS "EXPENSE"

FIG. 17

According to last paragraph of Procedure, if the Advances are greater than total expenses, the system must force the confirmation of the account user. It is expressed as a precondition in the "TPAY" transaction. Next figure shows it.

The image shows a software window titled "Transición". It contains several fields and buttons:

- Origen:** A dropdown menu with "Approved" selected.
- Destino:** A dropdown menu with "Paid" selected.
- Buttons:** "Aceptar" (Accept) and "Cancelar" (Cancel) are located in the top right corner.
- Detalle:** A section on the left containing a label "Agente" and a text area with "AccountUser" and "SuperAdmin".
- Service:** A dropdown menu with "TPAY" selected.
- Precondición:** A text area containing the logical expression: `Balance > 0 OR ps_ReturnAdvance = TRUE`.
- Condición de control:** An empty text area below the precondition.
- Mensaje en caso de error:** A text area containing the message: "Check the advanced money excess".

DIALOG BOX TO MODEL PRECONDITION

FIG. 18

09072413.050104

09872443-060404

Conjunto de Visualización

Nombre: CV\_Expense Limpia Borrar

Attributos a visualizar:

Attributo	Tipo dato
Project.ProjectName	String
Employee.EmpName	String
Employee.EmpSur...	String
Status	Int
AuthoDate	Date
PaymentDate	Date
TotExpenses	Real
Balance	Real

Operaciones:

<< Añadir Eliminar >>

Subir Bajar

Aceptar

Attributos:

Attributo	Tipo dato
Cause	String
AuthoDate	Date
AuthoComments	String
PaymentDate	Date
PayComments	String
TotExpenses	Real
TotExpensesCur	Real
Advances	Real
AdvancesCur	Real
Exchange	Real
Balance	Real
BalanceCur	Real

Clase: Expense

Aceptar Cancelar

DIALOG BOX USED BY SOSY MODELER  
TO ESTABLISH A SET OF ATTRIBUTES  
TO BE DISPLAYED FOR THE "EXPENSE" CLASS

FIG. 19

09872413 060404

Filtro

Filtro:  Alias:

Fórmula:

Observ:

Variables

Nombre	Alias	Tipo dato	Tipo estilo	Estilo
vf_Project	Project	Project	Sel. Población	
vf_Employee	Employee	Employee	Sel. Población	
vf_DateIniIssue	Initial Issuing Date	Date		
vf_DateEndIssue	Final Issuing Date	Date		
vf_DateIniApp	Initial Approving D...	Date		

Tip: ☒ Simple ☐ Observado

Nombre:  Alias:  Tipo de dato:

Estilo de entrada:  Estilo de selección:

Class: Expense

DIALOG BOX USED BY SOSY MODELER  
TO ESTABLISH THE SEARCHING CRITERIA  
FOR THE EXPENSE CLASS AND TO ESTABLISH  
THE FILTER FORMULA <sup>TO USE</sup> AND THE VARIABLES  
TO REQUEST THE USER TO ENTER

FIG. 20

FLOWCHART OF THE FUNCTIONS THAT ALL SPECIES IN THE DOCUMENTATION  
GENERATOR TRANSLATOR SUBGENUS WILL PERFORM

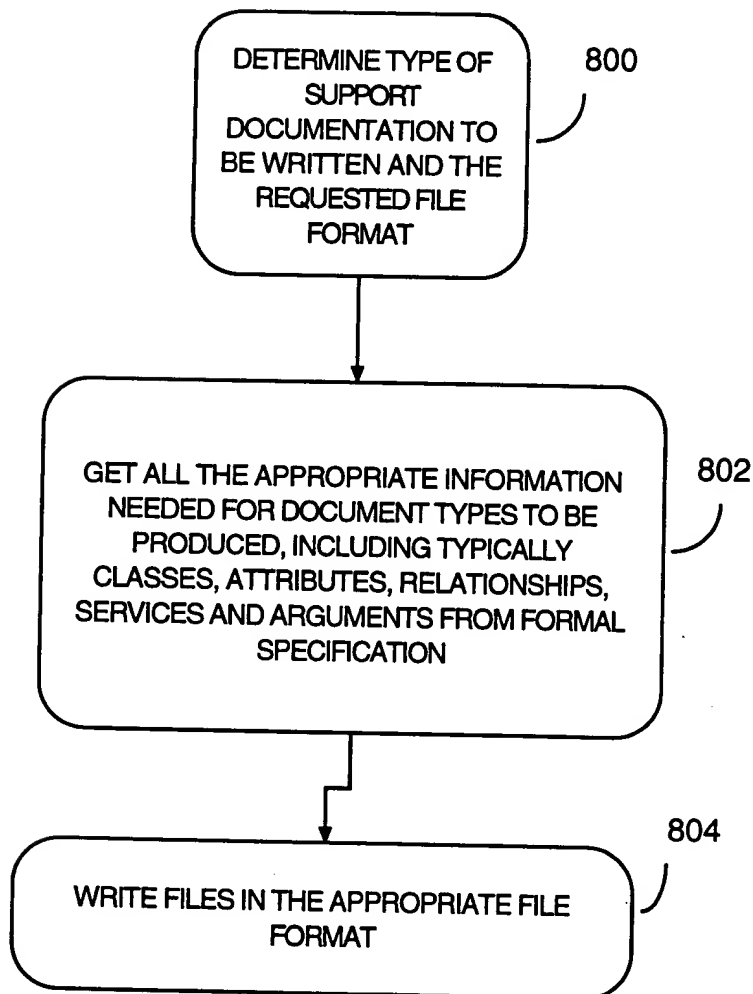


FIG. 21